

CLAIMS:

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A method for masking speech, comprising;
generating an electrical signal representative of the speech;
using said electrical signal to provide an audio signal which cancels the speech; and
providing a speech masking signal to mask any speech not canceled.

2. A method as recited in claim 1, wherein said speech masking signal is supplied by a babble generator.

3. A method as recited in claim 1, wherein said speech masking signal is produced by rearranging the speech so that it is not intelligible.

4. A method as recited in claim 1, wherein said speech masking signal is provided by pitch inverting the speech.

5. A method as recited in claim 4, wherein said pitch inverting is performed by steps comprising:
low pass filtering the electrical signal representative of the speech to provide a low pass filtered signal;

1 mixing the low pass filtered signal with a carrier
2 frequency to produce an output signal including the
3 carrier frequency and two side bands; and

4 low pass filtering the output signal to produce
5 the masking signal.

6 6. A method as recited in claim 1, wherein said speech
7 masking signal is produced by the steps of:

8 reading out digital representations of signals
9 disruptive to the understanding of speech from a
10 memory; and

11 converting the digital representations to said
12 speech masking signal.

13 7. A method as recited in claim 6, wherein said
14 digital representations are in the form of one of pulse
15 code modulation and adaptive pulse code modulation.

16 8. A method as recited in claim 6, wherein said digital
17 representations are representative of multiple persons
18 speaking simultaneously.

19 9. A method as recited in claim 1, wherein said speech
20 masking signal is produced by:

21 sampling portions of the speech; and

22 providing the portions in reverse order.

23 10. A method as recited in claim 9, wherein at least
24 one of amplitude and frequency of the masking signal is
25 changed at intervals.

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2 11. A method as recited in claim 10, wherein said
3 intervals are fixed, variable or random.

4 12. A method as recited in claim 1, wherein said
5 speech masking signal is produced by:

6 sampling portions of the speech; and
7 providing the portions with a predetermined time
8 delay.

9 13. A method as recited in claim 12, wherein at least
10 one of amplitude and frequency of the masking signal is
11 changed at intervals.

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13 14. A method as recited in claim 13, wherein said
14 intervals are fixed, variable or random.

15 15. A method as recited in claim 1, wherein said
16 speech masking signal is produced by:

17 sampling portions of the speech; and
18 providing the portions in reverse order and with a
19 predetermined time delay.

20 16. A method as recited in claim 15, wherein at least
21 one of amplitude and frequency of the masking signal is
22 changed at intervals.

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24 17. A method as recited in claim 1, wherein said
25 speech masking signal is produced by:

26 sampling portions of the speech; and

1 providing the portions in a random manner.

2 18. A method as recited in claim 17, wherein the
3 portions are provided so as to be random relative to
4 amplitude and frequency of the speech.

5 19. A method as recited in claim 17, wherein at least
6 one of amplitude and frequency of the masking signal is
7 changed at intervals.

8
9 20. A method as recited in claim 1, wherein the masking
10 signal is provided only when speech is present.

11 21. A system for masking speech, said system
12 comprising:

13 signal acquiring apparatus for generating an
14 electrical signal representative of the speech;

15 processing apparatus for using said electrical
16 signal to provide an audio signal which cancels the
17 speech; and

18 a signal generator for providing a speech masking
19 signal to mask any speech not canceled.

20 22. A system as recited in claim 21, wherein said
21 speech masking signal generator is a babble generator.

22 23. A system as recited in claim 21, wherein said
23 signal generator comprises circuitry for rearranging the

1 speech so that said speech masking signal is not
2 intelligible.

3 24. A system as recited in claim 21, wherein said
4 signal generator pitch inverts the speech.

5 25. A system as recited in claim 24, wherein said
6 signal generator comprises:

7 a first low pass filter for filtering the
8 electrical signal representative of the speech to
9 provide a low pass filtered signal;

10 a mixer for mixing the low pass filtered signal
11 with a carrier frequency to produce an output signal
12 including the carrier frequency and two side bands; and

13 a second low pass filter for low pass filtering
14 the output signal to produce the masking signal.

15 26. A system as recited in claim 21, wherein said
16 signal generator comprises:

17 a memory for storing digital representations of
18 signals disruptive to the understanding of speech; and

19 a converter for converting the digital
20 representations in the memory to said speech masking
21 signal.

22 27. A system as recited in claim 26, wherein said
23 digital representations in said memory are in the form
24 of one of pulse code modulation and adaptive pulse code
25 modulation.

1 28. A system as recited in claim 26, wherein said
2 digital representations in said memory are
3 representative of multiple persons speaking
4 simultaneously.

5 29. A system as recited in claim 21, wherein said
6 signal generator comprises:

7 a sampler for sampling portions of the speech;

8 a memory for storing the portions of the speech
9 that are sampled; and

10 a memory reader for providing the portions in the
11 memory in reverse order.

12 30. A system as recited in claim 29, further
13 comprising means for changing at least one of amplitude
14 and frequency of the masking signal at intervals.

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16 31. A system as recited in claim 39, further
17 comprising means for changing at least one of amplitude
18 and frequency of the masking signal at intervals that
19 are fixed, variable or random.

20 32. A system as recited in claim 21, wherein said
21 signal generator comprises:

22 a sampler for sampling portions of the speech; and

23 a time delay generator for providing the portions
24 with a predetermined time delay.

1 33. A system as recited in claim 32, further
2 comprising means for changing at least one of amplitude
3 and frequency of the masking signal at intervals.

4
5 34. A system as recited in claim 32, further
6 comprising means for changing at least one of amplitude
7 and frequency of the masking signal at intervals that
8 are fixed, variable or random.

9 35. A method as recited in claim 21, wherein said
10 signal generator comprises:

11 a sampler for sampling portions of the speech; and
12 a reverser for providing the portions in reverse
13 order and with a predetermined time delay.

14 36. A system as recited in claim 35, further
15 comprising means for changing at least one of amplitude
16 and frequency of the masking signal at intervals.

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18 37. A system as recited in claim 21, wherein said
19 signal generator comprises:

20 a sampler for sampling portions of the speech; and
21 a random generator for providing the portions in a
22 random manner.

23 38. A system as recited in claim 37, wherein the
24 random generator provides the portions so as to be
25 random relative to amplitude and frequency of the
26 speech.

1 39. A system as recited in claim 38, further
2 comprising means for changing at least one of amplitude
3 and frequency of the masking signal at intervals.

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5 40. A system as recited in claim 21, in combination
6 with a programmed digital computer, the system having
7 an output for providing said electrical signal
8 representative of the speech to said digital computer.

9 41. A system as recited in claim 21, implemented on a
10 digital computer, said computer having access to
11 program code for implementing at least a portion of
12 said system.

13 42. A system as recited in claim 21, wherein said signal
14 generator is configured so as to produce a masking
15 signal only when speech is present.

16 43. An article of manufacture comprising a computer
17 usable medium having computer readable program code
18 means embodied therein for causing a computer to:

19 generate an electrical signal representative of
20 the speech:

21 use said electrical signal to provide an audio
22 signal which cancels the speech; and

23 provide a speech masking signal to mask any speech
24 not canceled.

1 44. An article of manufacture as recited in claim 43,
2 further comprising program code for effecting a babble
3 generator to supply said speech masking signal.

4 45. An article of manufacture as recited in claim 43,
5 further comprising program code for producing said
6 speech masking signal by rearranging the speech so that
7 it is not intelligible.

8 46. An article of manufacture as recited in claim 43,
9 further comprising program code for pitch inverting
10 said speech to provide said speech masking signal.

11 47. An article of manufacture as recited in claim 46,
12 wherein said program code for pitch inverting comprises
13 code for performing the steps of:

14 low pass filtering the electrical signal
15 representative of the speech to provide a low pass
16 filtered signal;

17 mixing the low pass filtered signal with a carrier
18 frequency to produce an output signal including the
19 carrier frequency and two side bands; and

20 low pass filtering the output signal to produce
21 the masking signal.

22 48. An article of manufacture as recited in claim 43,
23 wherein said computer code for providing a speech
24 masking signal comprises code for:

25 digital representations of signals disruptive to
26 the understanding of speech; and for

1 converting the digital representations to said
2 speech masking signal.

3 49. An article of manufacture as recited in claim 48,
4 wherein said digital representations are in the form of
5 one of pulse code modulation and adaptive pulse code
6 modulation.

7 50. An article of manufacture as recited in claim 48,
8 wherein said digital representations are representative
9 of multiple persons speaking simultaneously.

10 51. An article of manufacture as recited in claim 43,
11 further comprising program code for producing said
12 speech masking signal by:

13 sampling portions of the speech; and

14 providing the portions in reverse order.

15 52. An article of manufacture as recited in claim 51,
16 wherein the program code for producing the speech
17 masking signal includes program code for changing at
18 least one of amplitude and frequency of the masking
19 signal, at intervals.

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21 53. An article of manufacture as recited in claim 52,
22 wherein said program code causes said intervals to be
23 fixed, variable or random.

24 54. An article of manufacture as recited in claim 43,
25 wherein the program code for producing the speech

1 masking signal includes program code for producing said
2 speech masking signal by:

3 sampling portions of the speech; and
4 providing the portions with a predetermined time
5 delay.

6 55. An article of manufacture as recited in claim 54,
7 wherein the program code for producing the speech
8 masking signal includes program code for changing at
9 least one of amplitude and frequency of the masking
10 signal, at intervals.

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12 56. An article of manufacture as recited in claim 55,
13 wherein said program code causes said intervals to be
14 fixed, variable or random.

15 57. An article of manufacture as recited in claim 43,
16 wherein the program code for producing the speech
17 masking signal includes program code for:
18 sampling portions of the speech; and
19 providing the portions in reverse order and with a
20 predetermined time delay.

21 58. An article of manufacture as recited in claim 57,
22 wherein the program code for producing the speech
23 masking signal includes program code for changing at
24 least one of amplitude and frequency of the masking
25 signal, at intervals.

1 59. An article of manufacture as recited in claim 43,
2 wherein the program code for producing the speech
3 masking signal includes program code for:

4 sampling portions of the speech; and

5 providing the portions in a random manner.

6 60. An article of manufacture as recited in claim 59,
7 wherein the program code is configured so that the
8 portions are provided so as to be random relative to
9 amplitude and frequency of the speech.

10 61. An article of manufacture as recited in claim 60,
11 wherein the program code for producing the speech
12 masking signal includes program code for changing at
13 least one of amplitude and frequency of the masking
14 signal, at intervals.

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16 62. An article of manufacture as recited in claim 43,
17 in combination with a computer for reading and
18 executing said computer readable program code.